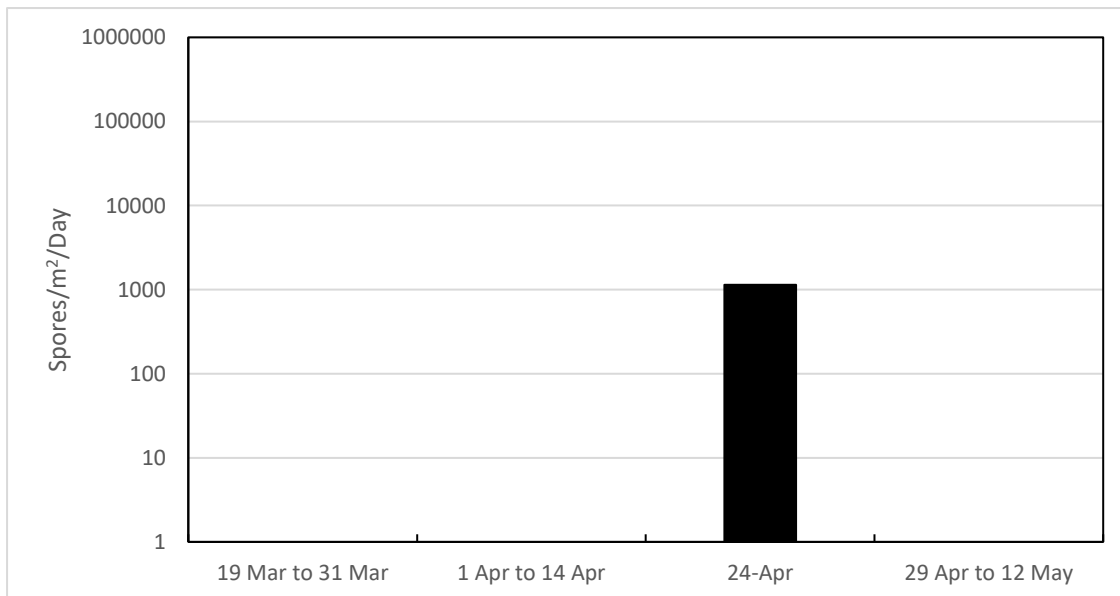


**Evaluation of fungicides for management of eastern filbert blight, 2021 - 2022.**

Healthy appearing two-year-old ‘Ennis’ hazelnut trees were planted from 19 to 22 Jan 2021 at the Botany and Plant Pathology Field Laboratory, Corvallis, OR. Trees were planted in 3 rows in an area 10 x 172 ft and 3 ft apart from each other. Limbs with EFB cankers were cut from heavily diseased trees during Jan and Feb 2021. A total of 285 cankered limbs were placed above test trees on chicken wire frames supported by a wooden trellis, on 4 Mar 2021. An additional source of spores included 3 brush piles (containing 15 to 25 infected branches) approximately 4 m west of the trellis area. Treatments were arranged in a randomized complete block design. Each treatment consisted of 8 single tree replicates. Fungicides were applied to trees from two directions, until runoff, using a Stihl SG20-Pump-Style backpack sprayer equipped with a brass hollow cone nozzle. Approximately 0.26 gal of a spray suspension was used per 8 trees within each treatment. Fungicide treatments were applied every two weeks on 25 Mar 2021 (bud break), 8 Apr 2021, 21 Apr 2021, and 5 May 2021 for a total of 4 applications. Additional applications for every week treatments were applied on 2 Apr 2021, 16 Apr 2021, 30 Apr 2021, and 13 May 2021 for a total of 8 applications. Casoron was applied as a pre-emergent herbicide on 18 Mar 2021. Makaze (3%) was applied alone as a general and/or spot treatment on 22 Jan 2021, 28 Apr 2021, and 4 June 2021, then tank mixed with Forfeit 280 (1.8 oz/gal) on 24 Jun 2021, 22 Jul 2021 and 19 Aug 2021 for management of weeds. In 2022 herbicides used as general and/or spot treatment for weeds included Roundup ProMax (3%) applied alone on 27 Apr 2022, Mad Dog (3%) tank mixed with Forfeit (1.7 oz/gal) applied on 8 Jun 2022, and Forfeit (1.7 oz/gal) was applied on 22 Jul 2022 and 1 Sep 2022. Trees were fertilized with 46-0-0 at a rate of 0.5 lb/6 trees on 24 Apr 2021, 12 Jul 202, 18 Apr 2022, and 26 Jul 2022. Suckers were managed by hand cutting on 14 Jul 2021, 11 Apr 2022, 19 May 2022, 18 July 2022, and 5 Aug 2022. Supplemental irrigation was provided as needed during the 2021 and 2022 growing season. Sunburn was rated on 10 Sep 2021 on a 0 to 5 scale. The number of EFB cankers on the main tree trunk and total length of these cankers/tree was determined during the late summer and fall of 2022.

Rainfall for the growing season (Oct 2020 to Sep 2021) was well below average with spring rainfall the lowest ever recorded. An unusual climate change related heat dome (heat wave) occurred for 3 days in late June with temperatures at or above 100°F. Symptoms of EFB had not developed by the end of the summer 2022 season likely due to the low spring rainfall and low spore counts in the prior spring (Figure 1). No phytotoxicity or growth regulation effects were observed on any of the treated trees during or after application. Weekly applications of Ziram resulted in heavy fungicide residue and slightly higher but not significant sunburn rating. Rango was difficult to get into solution unless the container of concentrated material was placed in a warm water bath prior to pouring and mixing.

Figure 1. Ascospore counts from bud swell through shoot elongation, 2021 growing season. There was only the one rainfall event during the spring on 24 April 2021.



Treatment and Rate/100 gal water	Number of Applications <sup>X</sup>	Ave Number of Cankers/Tree <sup>Y</sup>	Total Canker Length/Tree <sup>Y</sup> (in)	Sunburn Rating <sup>YZ</sup>
Non-treated .....	0	0	0	1.3
Miravis at 5.12 fl oz .....	4	0	0	1.6
Miravis Duo at 13.6 fl oz .....	4	0	0	1.7
Rango at 1.8 gal.....	4	0.1	0.25	1.4
Excalia at 4 fl oz.....	4	0	0	1.4
Cevya at 5 fl oz plus Induce at 16 fl oz.....	4	0	0	1.4
Cevya at 10 fl oz plus Induce at 16 fl oz.....	4	0	0	1.6
Cevya at 5 fl oz plus Induce at 16 fl oz plus Microthiol Disperss at 10 lb.....	4	0	0	1.5
BAS-75202F at 6 fl oz plus Induce at 16 fl oz.....	4	0	0	1.6
BAS-75202F at 8 fl oz plus Induce at 16 fl oz.....	4	0	0	1.3
Ziram 76 DF at 3.25 lb plus Induce at 12 fl oz.....	8	0.1	0.1	2.1
Ziram 76 DF at 3.25 lb plus AgriCell Biofungicide at 2 gal plus Induce at 12 fl oz.....	8	0	0	1.8
AgriCell Biofungicide at 2 gal plus Induce at 12 fl oz.....	8	0	0	1.0

<sup>X</sup> Fungicide treatments were applied every two weeks from bud break on 25 Mar 2021 (bud break), 8 Apr 2021, 21 Apr 2021, and 5 May 2021 for a total of 4 applications. Additional applications for every week treatments were applied on 2 Apr 2021, 16 Apr 2021, 30 Apr 2021, and 13 May 2021 for a total of 8 applications.

<sup>Y</sup> Analysis of variance is based on log (x+1) transformation. Means followed by the same letter do not differ significantly based on Fisher's protected LSD ( $P=0.05$ ). Means without letters do not differ.

<sup>Z</sup> Sunburn rating was on a 0 to 5 scale where 0 = no sunburn; 1 = slight discoloration typical of hazelnuts at the end of the growing season; 2 = leaf discoloration and some marginal leaf necrosis; 3 = even more marginal leaf necrosis and yellowing, 4 = many leaves with marginal or entire leaf burn; and 5 = dead or severely burned trees.